

CLAIMS

1. A printable electronic display comprising:

- a. a first set of electrodes;
- b. a second set of electrodes disposed in an intersecting pattern with respect to the first set of electrodes, the first and second sets of electrodes not contacting one another;
- c. a particle-based, nonemissive display; and
- d. a plurality of nonlinear elements,

the display and the nonlinear elements being disposed between the first and second sets of electrodes so as to electrically couple at least some electrodes of the first set with corresponding electrodes of the second set at regions of intersection.

2. The display system of claim 1 wherein the nonemissive display is an electrophoretic display.

3. The display system of claim 1 wherein the nonemissive display is a rotating-ball display.

4. The display system of claim 1 wherein the nonemissive display is an electrostatic display.

1 5. The display system of claim 1 further comprising a thin, flexible substrate.

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1 6. The display system of claim 1 wherein the first and second sets of electrodes are each
2 arranged in a planar configuration, the electrodes of the first set being orthogonal to the
3 electrodes of the second set.

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1 7. The display system of claim 6 wherein the electrophoretic display material and the
2 nonlinear elements are arranged in planar form and sandwiched between the first and
3 second sets of electrodes.

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1 8. The display system of claim 1 wherein the electrophoretic display comprises a plurality
2 of discrete, microencapsulated electrophoretic display elements.

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1 9. The display system of claim 8 wherein the electrophoretic display comprises:

2 a. an arrangement of discrete microscopic containers, each container being no
3 longer than 500 μm along any dimension thereof; and

4 b. within each container, a dielectric fluid and a suspension therein of particles
5 exhibiting surface charges, the fluid and the particles contrasting visually, the
6 particles migrating toward one of the sets of electrodes in response to a potential
7 difference therebetween.

8

1 10. The display system of claim 1 wherein the first and second sets of electrodes are
2 printable, at least one of the sets of electrodes being visually transparent.

3

1 11. The display system of claim 1 wherein the nonlinear elements are printable.

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1 12. The display system of claim 1 wherein the electrophoretic display is printable.

2

1 13. The display system of claim 11 wherein the nonlinear elements are a print-deposited
2 ink exhibiting a nonlinear electrical characteristic.

3

1 14. The display system of claim 13 wherein the ink comprises:

a. a binder for printing; and

b. ZnO particles doped with at least one compound selected from the group

consisting of sintered ZnO, Sb₂O₃, MnO, MnO₂, Co₂O₃, CoO, Bi₂O₃ and Cr₂O₃.

15. The display system of claim 14 wherein the binder comprises ethyl cellulose and butyl carbitol.

1 16. The display system of claim 15 wherein the binder further comprises a glass frit.

2

1 17. The display system of claim 15 wherein the binder comprises an epoxy resin.

2

1 18. The display system of claim 15 wherein the binder comprises a photohardenable
2 resin.

3

1 19. The display system of claim 13 wherein the ink comprises:

2 a. a binder for printing; and

3 b. a doped, particulate silicon.

4

1 20. The display system of claim 19 wherein the binder comprises ethyl cellulose and butyl
2 carbitol.

3

1 21. The display system of claim 19 wherein the binder further comprises a glass frit.

2

1 22. The display system of claim 19 wherein the binder comprises an epoxy resin.

2

1 23. The display system of claim 19 wherein the binder comprises a photohardenable
2 resin.

3

1 24. The display system of claim 1 wherein the electrodes comprise a print-deposited
2 conductive ink.

3

1 25. The display system of claim 19 wherein the electrodes comprise a print-deposited
2 conductive ink providing a rectifying contact to the silicon.

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1 26. The display system of claim 24 wherein the ink is transparent.

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1 27. The display system of claim 24 wherein the ink comprises indium tin oxide.

2

1 28. The display system of claim 1 wherein each set of electrodes is arranged in lanes with
2 spaces therebetween, and further comprising an insulating material located in the spaces.

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1 29. The display system of claim 28 wherein the insulating material comprises Acheson
2 ML25208.

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1 ²⁹
~~30~~. The display system of claim 1 wherein the nonlinear elements comprise Schottky
2 diodes.

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1 ³⁰
~~31~~. The display system of claim 1 wherein the nonlinear elements comprise PN diodes.

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1 ³¹
~~32~~. The display system of claim 1 wherein the nonlinear elements comprise varistors.

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1 ³²
~~33~~. The display system of claim 1 wherein the nonlinear elements comprise silicon films
2 formed from silicide salt.

3

1 ³³
~~34~~. The display system of claim 1 wherein the nonlinear elements comprise a polymer
2 conductor.

3

1 ³⁴
~~35~~. A method of fabricating an electronic display, the method comprising the steps of:

2 a. print-depositing a first set of electrodes onto a substrate;

b. print-depositing a plurality of nonlinear elements above at least some of the electrodes;

c. print-depositing a particle-based nonemissive display material over the nonlinear elements; and

d. print-depositing a second set of electrodes over the display material and in an intersecting pattern with respect to the first set of electrodes,

the display material and the nonlinear elements electrically coupling at least some electrodes of the first set with corresponding electrodes of the second set at regions of intersection.

36. The method of claim 35 wherein the nonemissive display is an electrophoretic display.

37. The method of claim 35 wherein the nonemissive display is a rotating-ball display.

38. The method of claim 35 wherein the nonemissive display is an electrostatic display.

39. The method of claim 36 wherein the electrophoretic display comprises:

a. an arrangement of discrete microscopic containers, each container being no longer than 500 μm along any dimension thereof; and

b. within each container, a dielectric fluid and a suspension therein of particles exhibiting surface charges, the fluid and the particles contrasting visually, the particles migrating toward one of the sets of electrodes in response to a potential difference therebetween.

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1 40. An electronic display system comprising:

2 a. an electronic display;

3 b. a power supply physically separate from the display; and

4 c. means for electrically coupling the display with the power supply.

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1 41. The system of claim 40 wherein the coupling means comprises a first pair of

2 conductive plates associated with the display and a second pair of conductive plates

3 associated with the power supply, the first and second pairs of plates capacitively

4 coupling in physical proximity to each other.

1 42. The system of claim 40 wherein the coupling means comprises at least one antenna

2 associated with the display and at least one antenna associated with the power supply,

3 the antennas inductively coupling to each other.

1 43. The system of claim 40 wherein the electronic display comprises at least one printed

2 element.

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1 44. The system of claim 40 wherein the electronic display comprises a printed

2 electrophoretic ink.

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1 45. A graduated display comprising:

